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普通高等学校计算机科学与技术专业新编系列教材

Specialized English for Computer

计算机专业英语



张端金 主编

```
#include <stdio.h>
#include <stdio.h>
void main()
void main()
{
    void swap(int * ptr1,int * ptr2);
    void swap(int * ptr1,int * ptr2);
    int x,y, * ptr1, * ptr2;
    int x,y, * ptr1, * ptr2;
    printf("input x,y:");scanf("%d,%d",&x,
    printf("input x,y:");scanf("%d,%d",&x,
    printf("%d\t%d\n",x,y);ptr1=&x;ptr2=
    printf("%d\t%d\n",x,y);ptr1=&x;ptr2=
    if(x<y)
    if(x<y)
    swap(ptr1,ptr2);
    swap(ptr1,ptr2);
    printf("%d\t%d\n",x,y);
    printf("%d\t%d\n",x,y);
}
void swap(int * ptr1,int * ptr2)
void swap(int * ptr1,int * ptr2)
```

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Specialized English for Computer 计算机专业英语

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内 容 提 要

本书主要涉及计算机技术基础、系统和应用各个方面,其中许多内容反映了 21 世纪计算机新技术的前沿研究方向,取材新颖,系统性强。全书共分 13 章,包括计算机学科简介、硬件基础、操作系统、程序语言、算法设计与分析、并行处理、数据挖掘、图像处理与机器视觉、计算机网络与通信、信息与网络安全、电子商务、Internet 拥塞控制、国际学术交流。每章包含英语原文、专业词汇和课文注释三部分内容,附录为常用的计算机专业词汇,供使用者查阅时参考。

本书系普通高等学校计算机科学与技术专业新编系列教材,也可供相关专业的研究生和科技人员参考。

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出版说明

当今世界已经跨入了信息时代,计算机科学与技术正在迅猛发展。尤其是以计算机为核心的信息技术正在改变整个社会的生产方式、生活方式和学习方式,推动整个人类社会进入信息化社会。为了顺应时代潮流,适应计算机专业调整及深化教学改革的要求,充分考虑到不同层次高校的教学现状,满足广大高校的教学需求,武汉理工大学出版社经过广泛调研,与国内近 30 所高等院校的计算机专家进行探讨,决定组织编写“普通高等学校计算机科学与技术专业新编系列教材”。

我们在组织编写新编本套系列教材时,以培养现代化高级人才为重任,以提高学生综合素质、培养学生应用能力和创新能力为目的,以面向现代化、面向世界、面向未来为准绳,注重系列教材的特色和实用性,反映最新的教学与科研成果,体现本专业的时代特征。同时,面对教育改革的需要、人才的需要和社会的需要,在编写本教材时,借鉴、学习国外一流大学的先进教学体系,结合国内的实际需要,吸取具有先进性、实用性和权威性的国外教材的精华,以更好地促进国内教材改革顺利进行。从时代和国际竞争要求的高度来思考,为打造一套高起点、高水平、高质量的系列教材而努力。

本套教材具有以下特色:

与时俱进,内容科学先进——充分体现计算机学科知识更新快的特点,及时更新知识,确保教材处于学科前沿,以拓宽学生知识面,培养学生的创新能力。

紧跟教学改革步伐,体现教学改革的阶段性成果——符合全国高校计算机专业教学指导委员会、中国计算机学会教育委员会制订的“计算机学科教学计划 2000”的内容要求。

实现立体化出版,适应教育方式的变革——本套教材努力使用和推广现代化的教学手段,凡有条件的课程都准备组织编写、制作和出版配合教材使用的实验、习题、课件、电子教案及相应的程序设计素材库。

本套教材首批 25 种预定在 2003 年秋季全部出齐。我们的编审者、出版者决不敢稍有懈怠,一定高度重视,兢兢业业,按最高的质量标准工作。教材建设是我们共同的事业和追求,也是我们共同的责任和义务,我们诚恳地希望大家积极选用本套教材,并在使用过程中给我们多提意见和建议,以便我们不断修订、完善全套教材。

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2002 年 10 月

前 言

根据普通高等学校计算机科学与技术专业(本科)新编系列教材编委会的总体要求,遵照“计算机专业英语”课程的教学内容,依据编委会审定通过的“计算机专业英语”教材大纲,我们编写了本书。

本书分13章。每章包括摘要、课文、专业词汇、注释、本章小结五个部分。除第1章和第13章外,课文内容全部选自英语原版著作和期刊文献。为了使读者能够了解我国计算机科学与技术学科的发展历程以及对外学术交流等情况,我们特别编写了第1章和第13章。其他各章都是计算机学科研究的主要内容和前沿方向。

本书由郑州大学张瑞金任主编。张瑞金主持制定编写提纲,对全书进行了统稿和审定,并具体编写第1章、第2章、第12章和附录。武汉理工大学高曙编写第3章、第5章和第6章,袁景凌编写第7章和第8章,林泓编写第4章;华南理工大学杨革编写第9章、第10章和第11章;暨南大学张祖梅编写第13章。

在本书的编写过程中,郑州大学在校硕士生刘侠、青年教师张文英参与了资料收集、内容整理和文字录入等工作;武汉理工大学王珏参与了对书稿校核工作;在此表示感谢。

由于编者的水平有限,不妥和错误之处在所难免,恳请读者给予批评指正。

编 者

2003年1月



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1 Introduction to Computer Science and Technology

Abstract

This chapter deals with the brief introduction to the computer science and technology discipline, which consists of computer system architecture, computer software and theory, and computer application technology. Development of this discipline in China is presented, and related courses and prospects of computer science and technology are also discussed.

1.1 Introduction to the Computer Science and Technology Discipline

The computer is one of the most significant scientific and technological achievements of the 20th century. It has become the most widely used and the most powerful information-processing tool in all lines of work of a modern country. With computer as its research object, the computer science and technology is the first-level academic discipline that studies the theory, the principle, the method, the technology about the design and the manufacture of computer as well as the application of computer such as information acquisition, representation, storage, processing, and control by the computer^[1].

The computer science and technology discipline possesses the characteristics of both science and technology. The term "computer science" was introduced in 1963 by Professor Forsythe of Stanford University of the United States. It grew from theories that originated well before technology could produce the machines envisioned by early researchers. Computer science lays stress

on studying the phenomena and uncovering the regularity whereas technology puts more emphasis on the study of computer manufacture, information-processing methods and the technical means.^[2] In sum, the computer science and technology is a blend of theoretical research and advanced technology, with each influencing the other in a mutually beneficial relationship.

The computer science and technology discipline seeks to build a scientific foundation for such topics as computer design, computer programming, information processing, algorithmic solutions of problems, and the algorithmic process itself. Consequently, it provides the underpinnings for today's computer applications as well as the foundations for tomorrow's applications. It follows that we cannot become knowledgeable in computer science by studying only a few topics as isolated subjects or by merely learning how to use the computing tools of today. Rather, to understand the science of computing, we must grasp the scope and dynamics of a wide range of topics.

Over the last four decades, as computers have been applied increasingly extensively, the availability of desktop computers has brought computer science and technology to the forefront of today's society, and this new discipline has established itself as the science of algorithms. As we have seen, the scope of this science is broad, drawing such diverse subjects as mathematics, engineering, psychology, biology, business administration, and linguistics. The computer science and technology discipline covers three research areas: Computer System Architecture, Computer Software and Theory, Computer Application Technology.

Computer System Architecture puts great emphasis on studying the physics or hardware construction of computer system, attributes of each part and relations among these parts^[3]. It can be classified as system architecture and the realization of the system architecture. The former emphasizes the function behavior of computer system and the concept architecture from the view of personnel of developing the system software; the latter considers the architecture and realization of the system, such as the architecture and realization of CPU memory. In addition, there is another opinion that Computer System Architecture denotes the system architecture and looks upon the realization of system architecture as computer organization. Computer System Architecture is concerned with computer organization and architecture, computer reliability, availability and serviceability, and computer performance evaluation. Its research re-

volves around processor architecture, memory system, parallel processing, distributed system, network protocol, internetworking technique, computer availability and serviceability, benchmark of performance evaluation and computer system performance simulation, etc.

Computer Software and Theory studies theories, methods and techniques in developing, maintaining and using computer software. It is concerned with software theory, algorithm theory, reasoning technique and theorem proving, software engineering, and theory of programs. It covers a wide range of research areas related to computer science theory, programming methodology, software structure, software development environment, computer aided software engineering (CASE), operating systems, database system, data mining, distributed software systems, human-computer interaction system, user interface management system (UIMS), distance education technique.

Computer Application Technology focuses on researching principle, method and technique in every field-involved computer^[4]. The topics in the areas of computer applications are wide, such as Chinese information processing (CIP), digital image processing, artificial intelligence, natural language understanding (NLU), human-computer interaction techniques, virtual reality (VR), electronic design automation (EDA), multimedia communication, computer supported co-operative work (CSCW), pattern recognition, knowledge engineering and expert system, electronic commerce.

Specialized English Words

discipline	学科	CIP (Chinese information processing)	中文信息处理
acquisition	获取	compatibility	兼容性
envision	想像, 预想	benchmark	基准
mutually	互相, 互助	data mining	数据挖掘
underpinning	基础, 支柱	artificial intelligence	人工智能
desktop	桌面, 桌上型电脑	CSCW (computer supported co-operative work)	计算机支持的协同工作
forefront	最前部, 最活动的中心	VR (virtual reality)	虚拟现实
diverse	不同的, 变化多的	distance education	远程教育
linguistics	语言学	distributed	分布式的
NLU (natural language understanding)	自然语言理解		

Notes

[1] With computer as its research object, the computer science and technology is the first-level academic discipline that studies the theory, the principle, the method, the technology about the design and the manufacture of computer as well as the application of computer such as information acquisition, representation, storage, processing, and control by the computer. 计算机科学与技术以计算机为研究对象, 是研究计算机的设计与制造, 利用计算机进行信息获取、表示、储存、处理与控制等的理论、原则、方法和技术的一级学科。

[2] Computer science lays stress on studying the phenomena and uncovering the regularity whereas technology puts more emphasis on the study of computer manufacture, information-processing methods and the technical means. 计算机科学侧重研究现象与揭示规律; 计算机技术侧重研究计算机的制造以及使用计算机进行信息处理的方法与技术手段。

[3] Computer System Architecture puts great emphasis on studying the physics or hardware construction of computer system, attributes of each part and relations among these parts. 计算机系统结构着重于研究计算机系统的物理硬件结构, 每个部分的作用以及各部分之间的联系。

[4] Computer Application Technology focuses on researching principle, method and technique in every field-involved computer. 计算机应用技术重点研究计算机各个领域的原理、方法和技术。

1.2 Computer Science and Technology as a Discipline in China

In the 1950's, China initiated the computer cause. As the first comprehensive research institution for computer science, the Institute of Computing Technology of Chinese Academy of Sciences was established in 1958. It developed the earliest computers in China, which were Mini-type 103 Digital Computer in 1958 and Large-Type 104 General Digital Computer in 1959.

Meanwhile, the University of Science and Technology of China instituted the speciality of Computer Science and Technology in 1958, and in 1982 this speciality developed into the Department of Computer Science and Technology. Tsinghua University founded the Department of Computer Science and Technology in 1958, and it has been known for its significant contributions and key

achievements in the history of the development of our nation's computer industry.

Ever since then, the computer science and technology discipline has expanded rapidly and developed into a complete cultivation pattern, which mainly consists of undergraduate program, Master's program, doctoral program, and postdoctoral program^[1]. In the year 2002, 29 colleges in China newly added the undergraduate major of computer science and technology, thus colleges with the computer speciality amounted to 374. In China today, 174 institutions with the computer science and technology discipline have obtained the rights of conferring graduate degrees, while 15 institutions can confer the doctorate degree within the first-level discipline, 28 institutions have the doctoral program and 132 institutions have the master's program^[2]. What's more, over 20 postdoctoral research stations for computer science and technology have been established in key universities and institutes.

Among the 964 national key disciplines verified and ratified by the Ministry of Education of China in 2002, the second-level disciplines of the computer science and technology of 13 universities were chosen as the national key subjects^[3]. The key disciplines and the affiliated universities are distributed as follows: Computer system architecture disciplines to Tsinghua University and Huazhong University of Science and Technology; computer software and theory disciplines to the 5 universities as Peking University, Beijing University of Aeronautics and Astronautics, Jilin University, Shanghai Jiaotong University, Nanjing University; computer application technology disciplines to the 8 universities such as Tsinghua University, Peking University, Northeastern University, Harbin Institute of Technology, Southeastern University, Zhejiang University, Anhui University and Northwestern Polytechnical University.

In order to improve conditions for teaching and research, some state key laboratories and national engineering research centers in China's key universities and research institutes have been founded^[4]. The typical state key laboratories (SKL) concerned with computer science are SKL of Intelligent Technology and Systems at Tsinghua University, SKL of Novel Software Technology at Nanjing University, SKL of CAD & CG at Zhejiang University and SKL of Information Security at Chinese Academy of Sciences. National Engineering Research Center for CAD Supporting Software and National CIMS Engineering Research Center are both at Tsinghua University.